Full-Duplex Data Transmission 006

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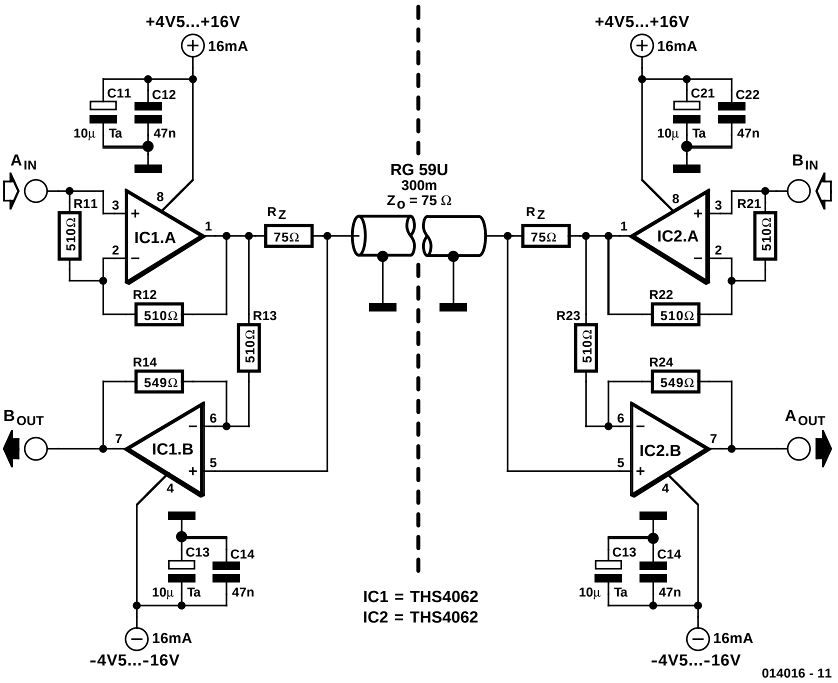

The TH4062 is a dual video amplifier with a 3-dB bandwidth of 180 MHz. This video opamp also features low noise, a high output current of ±100 mA, a very high slew rate, extremely low phase and gain errors (0.02 ° and 0.02 %) and outstandingly low crosstalk (–110 dB). These properties make the TH4062 an excellent choice for use in a high-speed data link. The full-duplex capability supports bi-directional communications (without a changeover switch) for distances of up to 300 m using a coaxial or twisted-pair cable.

The circuit diagram shows that all tha is needed is four opamps (housed in two ICs), a few resistors and some capacitors to decouple the supply voltage. Two independent PAL signals are fed into inputs A_{IN} and B_{IN}. These signals appear unchanged at the corresponding remote outputs A_{OUT} and B_{OUT}. Resistor R_Z plays a special role here. In addition to ensuring that the opamps have adequate phase margin with capacitive loads, and thus preventing high-frequency oscillations, it serves as a differential network. At the input amplifier, the signal from the adjacent output amplifier is subtracted from the summed signals on the live conductor of the cable, which is connected to the non-inverting input of the input amplifier. In this way, the undesired signal is eliminated in a simple but effective manner.

In building the circuit, make sure that the decoupling capacitors are located as close as possible to the ICs, and arrange the ICs and circuit tracks so that crosstalk is minimised. Only in this way is it possible to realise the excellent measured results listed below. The stabilised supply voltage may lie between ±4.5 V and ±16 V, and the maximum current load is 16 mA.

The link between the two ends is formed by an RG-59/U cable with a characteristic impedance of 75 Ω, which may be up to 300 m long. If a twisted-pair cable is used, the value of R_Z may be reduced (≥ 20 Ω).

The data sheet for this interesting video opamp (and for a single opamp with the same characteristics, the THS4061), can be found at the following address:

http://www-s.ti.com/sc/psheets/slos234d/slos234d.pdf

Several interesting application notes can also be downloaded from the immediate 'neighbourhood' of the datasheet.

(014016-1)

Technical data

Supply voltage range:	U_S	±4.5 to ±16	V
Current consumption	I_S	16	mA
Bandwidth (–3 dB)	GBW	180	MHz
Bandwidth (–0.1 dB) (G = +1)	BW	75	MHz
Slew rate	SR	400	V/µs
Offset voltage	U_{ios}	2.5	mV
Offset drift		15	µV/K
Distortion	THD+N	–72	dBc
Common-mode rejection	CMRR	110	dB
Phase error		0.02	degree
Gain error		0.02	%
Noise	e_n	14.5	nV/√Hz
Output Current	I_{out}	115	mA
Operating temperature THS4062xx	CD (SOP8)	0 to 70	°C
	CDGN (SSOP8)	0 to 70	°C
	ID (SOP8)	–40 to +85	°C
	IDGN (SSOP8)	–40 to +85	°C